SOIL SURVEY OF WHITE COUNTY, INDIANA.

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DESCRIPTION OF THE AREA.

White County is situated in the northwestern part of Indiana. It is bounded on the northwest by Jasper County, on the north by Pulaski County, on the east by Cass and Carroll Counties, on the south by Tippecanoe County, and on the west by Benton County, being separated from Carroll County for a short distance by the Tippecanoe River. The county is irregular in outline, having an extreme length from east to west of 27 miles in the north-central part and an extreme width of 24 miles in the central part. It embraces an area of 507 square miles, or 324,480 acres.

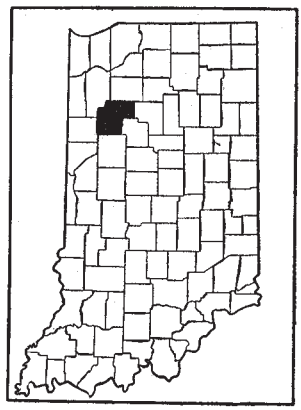

FIG. 45.—Sketch map showing location of the White County area, Indiana.

The topography of White County is generally that of a level to gently undulating plain. There are three main physiographic divisions: (1) The till plain and low moraines identified by Leverett as of Early Wisconsin age; (2) the old lake plain and associated ridges of the Kankakee basin; and (3) the bottoms of the Tippecanoe River and its tributaries.

The first of these divisions occupies the southern half of the county and is divided into forested and prairie regions. The forested belt, or "clay land," lies adjacent to the Tippecanoe River and extends 3 to 7 miles westward into the Prairie region as long tongues along the larger creeks. The area lying between the Pennsylvania Railroad and the Carroll County line is included in this region. Throughout the forested belt are areas of black land which were the beds of old sloughs and marshes. The forest growth was never so heavy in White County as farther east in Indiana, but the original forests contained many large trees, including white, red, and black oak, hickory, tulip, elm, sycamore, maple, walnut, and basswood. The topography of this region is comparatively uneven, because of the several stream valleys which have been cut through it and the few low morainic ridges occurring in this locality.

The prairie region occupies the southwestern part of the county. On the east the prairie dovetails with the timbered land along the Tippecanoe River and extends north to the low, wooded sand ridge which reaches from Monticello through Smithson and Westpoint Church. The prairie also includes the land within a radius of 3 or 4 miles of Wolcott, but in that locality the soils are somewhat lighter in texture than the main body of prairie land. The prairie region is a gently undulating plain, which was originally devoid of all trees, except some large, scattered cottonwoods and a few isolated groves where timber had gained a foothold and was protected from prairie fires by surrounding bodies of marshy land. Several low morainic ridges traverse this region in an east-west direction, one of which lies just north of Badger Grove and another along the northern line of Round Grove Township. From the tops of these ridges the very flat land between them in many places resembles an old lake basin.

Much of the land was originally very marshy and water covered it during rainy seasons, but it is now well drained by ditches and tile drains. The soils are deep, black, and of a very uniform silty texture.

The northern half of White County is a part of or is closely related to the old lake plain or marshes of the Kankakee Basin. It skirts the prairie land about Wolcott and is separated from the silty or "clay" lands on the south by a distinct boundary which is marked by low, broken sand ridges running through Westpoint Church, Smithson, Monticello, Idaville, and Burnetts Creek. In many places this boundary is marked by an abrupt change from deep yellow sand to heavy black lands, while elsewhere there are transitional zones of loam and fine sandy loam soils.

While the general topography of the lake region is quite flat, every section is broken more or less by sandy ridges from 3 to 40 feet high. The ridges inclose the flats in such a way as to prevent natural surface drainage, which has resulted in the formation of extensive marshes and ponds in which numerous muck beds have been developed. The ridges were invariably forested, as were some of the better drained flats, but the wetter areas bore a heavy growth of marsh grasses, rushes, and flags.

The third physiographic division, or river bottoms, embraces a relatively small area. Along the Tippecanoe River and some of the larger creeks there are narrow, overflowed bottoms, seldom more than 200 to 300 yards wide. They lie 3 to 10 feet above normal stream level and from a few feet to over 100 feet below the general level of the plains. In many places the bottoms are bordered by steep slopes or perpendicular bluffs and the eroded belt of land seldom extends more than a quarter of a mile back from the valley. Within most of the larger bends of the Tippecanoe River below

Wrights Ford and along the larger creeks there are second bottoms which lie from 10 to 40 feet above the streams and are not now subject to overflows. These are the remnants of old flood plains formed by the streams when they carried large volumes of water from the melting glaciers and so formed the characteristic gravel substratum. These terraces are usually flat, although a number of them have decided slopes from their upper limits to the first-bottom level. They are uneroded, except where tributary streams cut through them.

The general elevation of White County is about 700 feet above sea level. The highest average levels are found along the Cass County and Benton County lines. Hickory Ridge, about 3 miles north of Brookston, is the most prominent elevation, rising about 50 feet above the surrounding lands. Another moraine of relatively pronounced relief is developed north of Chalmers.

Most of White County lies in the drainage basin of the Tippecanoe River, which crosses the north county line near Buffalo and flows in a general southerly direction to Monticello. It forms the east county line for about 5 miles south of Monticello, and from there flows only a short distance east of the county line. Bends of the river enter White County for a short distance at the Springboro Bridge and at the southeastern corner of Prairie Township. Formerly a large part of the county had inadequate natural surface drainage and no network of small streams was developed. The channels of the tributary streams, which were ill defined beyond a distance of 2 to 7 miles from the Tippecanoe River, did not effectually drain even the adjacent land. In many places ponds existed within a few feet of stream bluffs for lack of outlets. Now a complete system of ditches and tile drains rapidly carries away the rainfall from nearly all parts of the county. Monon Creek and its branches head in Pulaski County and drain the land north and east of Monon into the Tippecanoe River. Little Monon Creek and its branches head around Wolcott and flow toward Monon. On account of the limestone bars in the original creek bottom much of the water now flows through the dredged cut-off passing about 3 miles south of Monon and emptying into the Tippecanoe at Wrights Ford. Honey Creek parallels in a general way Little Monon Creek and flows into the Tippecanoe about 3 miles north of Monticello. The northeastern part of the county is well drained by Keans Creek and Pike Creek and a few other small ditches, which flow in a westerly direction.

The east-and-west line of sand ridges which bisects the county also divides the drainage. South of it Big, Spring, and Moots Creeks, together with several small streams, carry off the waters of the prairie region toward the east and southeast. A part of Round Grove Township is drained by the Vanatta ditch, which flows into Benton County and finds an outlet through the Fox River into the

Wabash. The land around Lee and in the northwestern part of Princeton Township also lies outside the Tippecanoe basin and the waters drain westward into Jasper County.

At Buffalo the Tippecanoe Valley lies only 15 to 30 feet below the surrounding country; at Monticello it is 85 feet below the plain and its valley reaches a depth of over 120 feet near the southern border of the county. The river in its upper course is comparatively straight, with a moderate current and a sandy bed. As it nears the border of the old lake plain the valley becomes deeper, the current swifter, and the bottom more rocky, and oxbows accompanied by high terraces appear. At Norway a small outcrop of shale occurs, and the "limestone riffles" below Monticello show where the stream has cut down through the glacial till to bedrock. The creek valleys equal that of the river in depth near their junction, but rise to the general land level within a few miles of their mouths.

The early settlers mainly were of English, Scotch, Irish, and Dutch descent and came largely from the States lying east of Indiana. Many came also from Tennessee and Kentucky. The number of foreign-born inhabitants has never been large. In recent years the country near Reynolds and Seafield has been colonized to some extent by farmers of German descent, and there has been an influx of Illinois farmers, attracted by the rich black lands of the county. There was a steady growth in population up to 1900, but a decrease of more than 1,500 in the following decade. The 1910 census reports the population of White County as 17,602, or about 35 persons to the square mile. The entire population is classed as rural.

Monticello is the county seat and largest town in the county, with a population in 1910 of 2,168. It is centrally located on the Chicago, Indianapolis & Louisville Railway (Monon Route) and on the Pittsburgh, Cincinnati, Chicago & St. Louis Railway (Pennsylvania System), 22 miles from Logansport, 85 miles from Indianapolis, and 98 miles from Chicago, and is the trading center for the surrounding country. Monticello has several thriving factories supporting a few hundred persons, and a hydroelectric plant on the Tippecanoe River which supplies light and power to over 20 towns and villages

Monon, with a population of 1,184 in 1910, is a junction point for the several branches of the Chicago, Indianapolis & Louisville Railway. Here are located a number of quarries which supply large quantities of crushed limestone for use on the roads of the county. Brookston, Wolcott, Reynolds, Chalmers, Burnetts Creek, Idaville, Seafield, Lee, Smithson, and Guernsey are important railroad towns. There are a number of smaller towns scattered throughout the county Over 80 per cent of the farms in White County are within 6 miles of one to four shipping points.

Chicago is the principal market for both grain and live stock, although Indianapolis and the East get a part of the products shipped from the county. Feeding cattle and sheep are often bought in Kansas City, Omaha, and other western points.

White County has an almost complete network of well-improved roads, which is being extended every year. The main pikes are surfaced with gravel or crushed limestone and are kept in good condition. There are some sandy roads in the northern half of the county and some graded dirt roads in the southern part, but practically all the roads can be traveled in all seasons by farm vehicles or light motor cars. All parts of the county have rural mail delivery and telephone service, and automobiles are in common use. The farmhouses and other buildings are well built and commodious.

CLIMATE.

The climate of White County is typical of that of north-central Indiana. There are no complete climatological records available for White County, but the records of the Weather Bureau station at Delphi, in Carroll County, may be taken as fairly representative of the conditions in White County, although Delphi is situated in the deep Wabash Valley, while White County occupies a higher level plain.

The mean annual temperature at Delphi is 50.1° F. While the winter mean is given as 26.8°, there are often great and sudden changes of temperature in the winter months, as shown by the recorded absolute maximum temperature of 70° and the minimum of −26° in January. Other seasons exhibit almost equal variability, an absolute maximum of 104° and an absolute minimum of 41° having been recorded in July.

The mean annual rainfall of 38 inches is well distributed throughout the year, but is heaviest during the growing season. Rainy or dry periods of several weeks' duration may occur, but droughts seldom are severe enough to cause extensive damage to the staple crops. The total precipitation for the driest year of which there is any record (1895) amounted to 27.17 inches, while the total for the wettest year (1907) was 44.91 inches. The average annual depth of snow is 28 inches.

The average date of the last killing frost in the spring is May 3, and that of the first in the fall is September 30, giving an average growing season of 150 days. The date of the latest recorded killing frost in the spring is May 31, and that of the earliest in the fall is September 14.

The table following gives the normal monthly, seasonal, and annual temperature and precipitation at Delphi.

Normal monthly, seasonal, and annual temperature and precipitation at Delphi, Ind.

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1895).	Total amount for the wettest year (1907).	Snow, average depth.
	°F.	°F.	°F.	Inches.	Inches.	Inches.	Inches.
December	29.7	64	−12	2.49	4.88	5.53	4.2
January	25.1	70	−26	2.64	2.64	7.00	8.8
February	25.5	67	−24	2.34	0.90	0.32	7.4
Winter	26.8	70	−26	7.47	8.42	12.85	20.4
March	37.5	85	− 3	3.18	1.06	3.93	5.2
April	49.9	93	13	3.17	1.97	1.91	0.5
May	60.9	97	25	4.60	1.06	2.87	0
Spring	49.4	97	− 3	10.95	4.09	8.71	5.7
June	70.7	99	37	4.40	1.42	5.50	0
July	74.4	104	41	3.74	2.68	6.43	0
August	71.7	100	37	3.03	2.69	3.86	0
Summer	72.3	104	37	11.17	6.79	15.79	0
September	65.0	100	25	2.91	2.81	3.94	0
October	51.9	91	18	2.09	0.76	1.31	T.
November	39.0	77	0	3.23	4.30	2.31	1.9
Fall	52.0	100	0	8.23	7.87	7.56	1.9
Year	50.1	104	−26	37.82	27.17	44.91	28.0

AGRICULTURE.

Farming was begun in White County about 1820. The early settlements were made on or near the forested areas and a large part of the food supply of the pioneers consisted of game obtained from the forests. Trees were girdled to form deadenings or else felled in windrows to make room for small fields of Indian corn, which was the main crop grown at that time. The early settlers usually grew also a little flax for cloth making, until they were able to protect a flock of sheep from the wild animals, when they used wool instead of linen. Wheat began to be grown generally as soon as gristmills were provided. Under this system much of the forested area of the county was gradually settled.

The better drained prairie land adjacent to the timbered ridges was first farmed in the thirties, but the "Grand Prairie," which extends unbroken westward into Illinois, was left unsettled until the fifties. At that time much of the prairie was quite marshy during the rainy seasons, and a solid sheet of water often covered the land west of Chalmers for several miles. The slight elevations in the prairie were

first broken and planted to corn, as crops were likely to be drowned out in the flatter fields. Each farmer owned from 300 to 800 head of cattle which were grazed on the open prairie.

Although the area of cultivated land and the building of fences had been gradually increasing on the prairie prior to 1874, the big crops and good prices of that year were largely responsible for the breaking of much virgin sod and the building of miles of three-board fences. Other changes followed in rapid succession; the introduction of barbed wire made the building of fences an easier task, and the establishment of dug and scraped drainage ditches made crops more certain. With the advent of the self-binder oats became an important crop on the prairie, being exceeded only by corn, and as a natural result the importance of cattle raising was greatly diminished. Dredge ditching began about 25 years ago and several of the main outlets have been deepened three times. The system of laterals is well developed and in recent years many miles of 24-inch and 30-inch tile have been laid in the open ditches and covered over, so that no land is wasted and farming operations are not hindered by them. In some sections the main drains have cost over $20 an acre, and an equal amount per acre has been expended for laterals, 4, 6, and 8 inch tile, laid in trenches 50 to 100 feet apart. In this way much marshy land has been reclaimed and good crops are assured every year.

At the present time the predominant type of agriculture consists of grain farming, in conjunction with the feeding of live stock, corn being the most important crop. Since 1900 about 100,000 acres each year, or nearly one-third the total area of the county, has been devoted to this crop. The census of 1910 reports 93,653 acres in corn, producing 3,418,196 bushels, or about 36 bushels per acre. A part of the corn crop is sold direct to the elevators, the remainder being fed to work stock, hogs, cattle, and sheep. It has been found more profitable to feed the grain to live stock than to sell it, and it is the practice to use as much of the crop as possible in this way. Corn silage is extensively fed to dairy cows and beef cattle. Yellow varieties of corn are planted almost exclusively.

The crop of second importance is oats, grown on 57,532 acres in 1909, with a production of 1,612,511 bushels. There has been a marked increase in the popularity of this grain, the 1900 census reporting 13,628 acres sown and 389,563 bushels produced. The ordinary yields range from 28 to 37 bushels per acre. A part of the grain is fed on the farms to work stock and a part is sold. The straw is used on the farms for bedding or sold in local towns. The wasteful practice of burning straw and stubble is seldom followed in this county.

More wheat (16,052 acres) than oats was sown in 1879, but both the acreage and the average yields have declined since that time. Many farmers believe that wheat is seldom a profitable crop, but others obtain returns which encourage them to sow this cereal every year. Wheat is strictly a cash crop. In 1909 there were 10,385 acres in wheat, from which 182,947 bushels, or about 17 bushels per acre, were obtained.

Rye is an unimportant crop, though the acreage devoted to it has been steadily increasing. In 1909, 2,775 acres were sown to rye, producing 30,213 bushels, or about 11 bushels per acre. This crop is usually grown in small fields where special soil conditions prevail.

The census reports 744 acres sown to buckwheat in 1909, with a production of 8,747 bushels, or about 12 bushels per acre. When fields can not be prepared in time to plant corn they are often used for buckwheat so that the land will not lie idle.

Hay has always been an important crop in White County. The census of 1890 reported 43,340 tons of hay obtained from 36,500 acres, or a little over 1 ton per acre. Probably much of this was wild, prairie or marsh hay. In 1909, 28,550 acres were devoted to hay and forage crops, including 20,524 acres of tame and cultivated grasses, 2,437 acres of wild, salt or prairie grasses, 93 acres of grains cut green, and 5,496 acres of coarse forage. Timothy exceeded all other hay crops, with a total area of 15,429 acres and a production of 17,411 tons. Most of it is fed on the farms or sold locally. Timothy and clover mixed were sown on 3,823 acres, producing 4,534 tons, and clover alone on only 791 acres, with a production of 914 tons. Red clover is the variety most grown and it often yields a seed crop as well as the hay. Big English and alsike clovers are occasionally sown. Millet is an unimportant hay crop. In 1909, 45 acres in alfalfa produced over 2 tons per acre. The acreage of this valuable hay crop has increased somewhat in recent years. There is a considerable acreage of permanent bluegrass pasture, besides marshes and woods which are also used for production of hay and as pasture land.

Within the last few years some cowpeas and soy beans have been grown, principally on the sandy soils. The value of these crops for hay, grain, and soil improvement is well known to the farmers on similar sandy soils in northern Indiana, and such crops will doubtless become more widely used in White County.

All farmers and many townspeople produce sufficient vegetables for home use, but none for shipping. Irish potatoes are grown in quantities about sufficient for the home markets. In 1909, 705 acres were planted to this crop, and the production was 63,256 bushels, or about 90 bushels per acre.

Apples, peaches, pears, and cherries are grown on a majority of the farms, but are given but little attention. There is a commercial

orchard near Monticello, the appearance of which would indicate that apple growing can be carried on successfully.

Grapes, berries of different kinds, and melons are grown in quantities for local use, but much early truck is shipped in from the South.

Nearly every farmer raises enough hogs to supply meat for the home and a surplus for shipping. In feeding hogs corn is usually supplemented with a little bran, shorts, tankage, and clover or bluegrass pasture.

Cattle feeding is a more important industry than hog raising. Many calves are dropped by the general-purpose cows on all farms, but the bulk of the feeders are shipped in from the West and from Chicago. These usually weigh about 900 to 1,000 pounds when received and are finished and shipped when weighing 1,200 to 1,400 pounds. As cattle are often bought and sold on a narrow margin, the profit from feeding them lies principally in the resulting soil improvement and in the gains made by hogs following them. The principal feeds are corn, corn stover, and silage, with bran, shorts, and other supplemental feeds. Winter feeding is most general, but some of those feeding large numbers of cattle find it more profitable to feed in the summer, so that the cattle can be marketed when the prices are highest.

A few sheep, mostly Shropshire, are raised in the county, and several thousand western feeders are imported each year. Sheep are fed on stubble and other pasturage, and may be finished with a little grain. They make quick gains and at the same time clean up the weeds in fence corners, orchards, and other places.

There are several breeders of registered stock in the county, who raise Shorthorn and Hereford cattle and Duroc Jersey and Poland China hogs.

Purebred flocks of the most important breeds of poultry are kept by some farmers. Farm chickens are usually of mixed breeds and return almost clear profit to the farmer, as most of their food is gleaned from the fields and around granaries. Hucksters gather poultry and eggs throughout the county and carry them to the towns. A packing plant at Monticello ships such products to the cities.

All the towns of the county are supplied with milk from local dairies and near-by farms. Some of the cows are of the dairy breeds, but most of them are of the general-purpose type. Milk is collected by wagons for several creameries and ice-cream factories in the county. A milk train on the Chicago, Indianapolis & Louisville Railway collects milk and cream along the line of that road for the Chicago markets. A cooperative creamery was established at Reynolds a few years ago, but this has been discontinued.

The total value of farm products in White County in 1909 was $4,665,547. The value of cereals was $2,545,915, or 54.6 per cent of

the total, and the revenue from live stock and products was $1,666,640, or about 35.7 per cent of the total. The value of poultry and eggs was $281,753 and the amount derived from dairy products sold was $119,933.

That the adaptation of crops to the soils is recognized and followed where practicable by the farmers is shown by the local distribution of crops in the county. Corn is grown on all types of soil, but it is well known that the deep, black lands, when not too wet or mucky, usually give the best results. The reclaimed marshes produce good yields of corn. Oats are suited to the same soils and conditions as corn, and do very well on the wetter lands. The prairie soils are recognized as almost ideal for grain farming, and wheat is confined almost entirely to the light-colored soils. It also does well on the black, sandy lands in the northern half of the county. Red clover makes better average yields of hay and seed on the light "clay lands," being somewhat subject to winter killing on black lands. Rye usually is grown on poor, thin ground where other crops would not thrive. It is used to protect slopes subject to washing and is the best crop for the sand dunes in the northern part of the county. The crop is often plowed under as a green manure with good results. Its place on the sands may well be taken by cowpeas, which improve the soil by the addition of nitrogen and organic matter and furnish a good leguminous hay, and it seems likely that this substitution will be made. The adaptation of the sandy lands of the lake plain and stream bottoms to melons and other truck crops is well known, but this industry has not been developed, mainly for economic reasons.

The farming methods in general use in White County are very good. Farm implements are of the most improved type. Part of the corn land is broken in the fall and the remainder in April or May, when the weather conditions are favorable, usually with single or gang (mold-board) riding plows, although there are some disk plows in use. The land is broken to an average depth of 6 inches, after which it is disked and harrowed until a good seed bed is obtained. Subsoiling implements are rarely used. Planting is usually done in May, a machine with a fertilizer attachment which applies from 100 to 200 pounds of commercial fertilizer per acre being used for this purpose. The seed is drilled in check rows averaging 3½ feet apart each way, 1 to 3 grains being planted to a hill, according to the strength of the land. Often a roller or weeder is run over the field before the corn is up. From 3 to 5 cultivations are given. The first cultivation is usually deep and close to the row, clod fenders being used to prevent covering the small corn. Subsequent cultivations are shallower and farther from the rows to avoid injury to the roots. The sweep type of cultivator is often used at this stage. Each cultivation is at right angles to the preceding cultivation and the fields are usually

kept very free from weeds, unless wet weather interferes. The crop is laid by in July. It is harvested in a variety of ways. Probably the largest part is husked from the standing stalks and hauled direct to elevators or to cribs which are slatted to allow drying. Some farmers cut and shock the corn and husk it during the winter. The corn binder is used to aid in that operation and also in gathering corn for silage. In some cases, especially when the corn is badly blown down, cattle and hogs are turned into the fields. The practice of picking seed corn at harvest time for the following year is not as general as it should be. More often the seed is selected from the cribs just before planting time.

The soil is seldom as well prepared for oats as for corn. Sometimes the land is disked and harrowed without plowing if the weather is wet in the spring. Seeding is done with drills at the rate of 1½ to 2 bushels per acre. The time of sowing is early in March. About the time corn is laid by and hay making is over oats are cut with the binder and shocked. Thrashing begins as soon as the straw is dry, and most of the grain is hauled direct from the machine to market. Part of the crop may be saved for horse feed and seed. The straw is used for bedding, winter roughage, and the roofs of winter shelters.

Wheat may be drilled between corn rows in the fall or sown on stubble ground which has been broken and finely pulverized by disking and harrowing. It is harvested just before oats and in the same manner.

The hay crops are sown in oat or wheat fields early in the spring and occupy the land after the nurse crop is removed. Sometimes the fields are pastured in the fall, the first crop of hay being cut the following season. Timothy is usually allowed to occupy the land several years or until it becomes thin. When timothy and clover are sown together the first crop consists largely of clover, but the clover afterwards dies out and leaves only timothy for succeeding crops. Red clover when grown alone is cut for hay in June and, if the growth warrants, again in the fall for seed.

The most common rotation on the prairie land consists of corn one or two years, followed by oats. A rotation consisting of corn, oats, and clover also is used. If a good stand of clover is not obtained it is plowed up and the land put in corn, which then usually gives increased yields. On the "clay" lands corn, wheat, and clover is often a successful rotation. The growing of legumes on such land is very necessary, but clover is not certain to "catch." Another rotation includes timothy in place of clover.

It is customary in White County to return all available manure to the soil and to feed live stock on the land in order to build it up, but comparatively little commercial fertilizer is used. In 1909 the total expenditure for fertilizer in the county amounted to $23,758, or

$48.58 per farm reporting its use. On the mucky or black "chaffy" lands of the lake-plain region it is the general practice to use potash in some form on corn.

Farm labor has become a large item of expense in White County. The total expenditure for labor in 1909 amounted to $239,356, or $236.28 per farm reporting. Good laborers receive $30 to $35 and board per month, or where hired for shorter periods, about $1 per day, except during harvest and haymaking, when $1.25 to $2 a day is paid. Many farmers exchange labor, especially at thrashing time.

According to the census, there were 1,906 farms in White County in 1880, 1,956 in 1890, 2,395 in 1900, and 2,091 in 1910. In 1880 the average size of farms was 117 acres, of which 79 per cent was classed as improved land, while in 1910 the average size was 150.4 acres and the proportion of improved land 88.3 per cent. In 1890, 65.39 per cent of the farms were operated by owners and the remainder by tenants, but there has been a gradual expansion of the tenant system since that time, the 1910 census reporting 53.5 per cent of the farms operated by owners, 44.3 per cent by tenants, and 2.2 per cent by managers. There is a tendency for the land to pass into large holdings and several individuals and companies now own 2,000 to 7,000 acres each.

Land values gradually increased from about $20 an acre in 1880 to $38 in 1900, and in the next decade there was a rapid rise to an average value of $77 an acre. Many farms in the prairie section are now valued at more than $200 an acre, and those on the light-colored "clay" lands at $125 to $175. The increase in value is partly due to the great improvement in drainage and roads.

SOILS.

The area of White County is approximately equally divided between an old glacial lake plain, known as the Kankakee Basin, in the north and a comparatively smooth till plain in the south. The underlying rocks of the area have contributed only indirectly to the formation of the soils, as they are usually deeply covered by glacial deposits. According to maps of the Indiana Department of Geology, the southwestern part of the county is underlain by a dark-colored shale rock at depths ranging to 100 feet or more. Between Chalmers and Wolcott it may generally be found between 15 and 50 feet below the surface. A sandstone formation occurs at some depth near Wolcott and was formerly a source of sand for glass making. Only one outcrop of shale rock was observed in White County. It is found in the north bank of the Tippecanoe River a few hundred yards above the mouth of Pike Creek and about 50 feet below the general level of the land. A line running northwest from that point

is, in a general way, the limit of the shale beds. Northeast of this line the land is underlain by the Niagara limestone. This formation outcrops in the bottom of the Tippecanoe River a short distance south of Monticello and at a number of points along Monon and Little Monon Creeks. In the vicinity of Monon and Lee a preglacial limestone hill comes within 3 to 20 feet of the present land surface. Along the general line of junction of the limestone and shale deposits wells have been driven 140 feet deep without striking rock.

According to the glacial theory, this part of the country was covered ages ago by a great glacial or ice sheet, which crept slowly down from the north and at one time probably approached the Ohio River. It melted back and advanced several times. Each time the great mass of ice brought down soil and rock from the north, smoothing down the hills and filling up the valleys in its path. The underlying rocks and those far to the north were ground up and the material was mixed and transported by the ice and the water formed by the melting ice. The old soils gave way to a heterogeneous mixture of material from limestone, shale, sandstone, and crystalline rocks ranging in texture from the finest clays to huge bowlders weighing many tons. Where the material was laid down under the ice rather level land was left after the recession, but along the fronts of the glacier terminal moraines of comparatively rough topography were formed. In such places large bowlders were frequently strewn thickly over the surface, but most of them have been removed from the fields of White County. The southern part of the county has a very uniform silty covering from 1 to 3 feet deep which no doubt is the result of the weathering of the glacial till.

When the ice sheet was melting the major streams carried larger volumes of water than at the present time. The swift currents carried coarse sands, gravels, and stones, which were deposited on the bottom lands. Later the channels were eroded down to lower levels, leaving these gravel beds 5 to 40 feet above overflow. As with the till uplands, the material in these terraces is of mixed origin, but a large proportion of the gravel is limestone.

Upon the last retreat of the glacier, areas in northern Indiana were left in a marshy condition and lakes occupied many of the depressions. This condition prevailed until about 1855, when extensive dredging operations were begun which are rapidly making this land fit for agriculture. The marshes were typically developed in the Kankakee basin, but the same conditions continue into, and terminate in, White County. The soils of this region are characterized by the very large percentage of fine sand particles which they contain and an entire absence of stones and other coarse material. In places the fine sand has been heaped into distinct dune forms, which have been protected

from recent wind erosion by trees and other vegetation. Some of the sand ridges are supposed to be based on morainic cores. Recent alluvium in comparatively narrow strips occurs along the Tippecanoe River and the other well-defined streams in the county. In permanent marshes the heavy growth of water-loving vegetation gives rise to muck beds. In a number of marshes there are local deposits of bog iron ore from a few inches to several feet below the surface. It is said that ore was dug and carried to the Wabash Canal in pioneer days, but the deposits are too small to be used or to have much influence upon the value of the land for agriculture.

In the southern and western sections of the county, where the soil-forming material is unassorted glacial débris or till, four distinct series of soils are developed. Where this material existed under prairie conditions it gives rise to the Carrington and Brookston soils; where well-drained and forested it gives the Miami soils; and in marshy areas it gives the heavier types of the Clyde series. The terminal moraines with more gravelly subsoils are better drained and oxidized and are sources of the Bellefontaine soils.

The sand deposits spread over the northern part of the county give light types of the Clyde series in the flat, poorly drained areas and the Plainfield series in the better drained, nearly level, and distinctly ridgy areas. All the terraces are classed in the Fox series and the first bottoms in the Genesee series. In all, 8 series, including 16 types, in addition to the miscellaneous classification, Muck, were recognized and mapped.

The Miami series includes light grayish brown surface soils resting upon heavier, compact, yellowish-brown subsoils, which usually are somewhat calcareous in the lower part of the 3-foot section. They are gently undulating to rolling in topography and have fair to good drainage. In White County the series is represented by the fine sandy loam, loam, and silt loam.

The surface soils of the Bellefontaine series are brown to slightly reddish brown. The subsoils are yellowish brown to reddish brown, rather compact, and rest upon a porous mass of stone and gravel at shallow depths. They are smoothly rolling to very irregular (morainic) in topography and are usually well drained. The soil and subsoil are either noncalcareous or only slightly calcareous, but the underlying material is strongly calcareous, a large proportion of it being derived from limestone. The Bellefontaine loam amd silt loam are represented in the county, these being confined to pronounced morainic ridges.

The Carrington series is characterized by dark-brown to almost black surface soils, with heavier textured, yellowish subsoils. They are nearly level to rolling in topography and have fair to good natural drainage. They are derived from a moderately calcareous glacial till, which has existed mainly under prairie conditions. The Carrington

fine sandy loam, loam, and silt loam, together with a flat phase of the loam, are mapped in White County.

The surface soils of the Brookston series are dark brown or dark brownish gray, and the subsoils are yellow and gray mottled, the yellow predominating. The upper subsoils may be dull drab in color, but, as a rule, the color brightens with depth until at from 18 to 24 inches it becomes almost a solid yellow or yellowish brown. Partially weathered, very friable, and loose calcareous till is encountered at a depth of 27 to 36 inches. The topography is level to very gently undulating, and the natural drainage poor. Nearly all areas have been drained artificially and are under a high state of development. Only the silt loam type is mapped in White County.

The Clyde series is characterized by dark brownish gray to black surface soils and gray or drab mottled subsoils. The soils of this series occur in flat to slightly depressed situations, and are naturally poorly drained. The heavier types of the series are derived from glacial till similar to that giving rise to the Miami and Carrington soils under better drainage conditions, while the lighter types through the lake plain area are from water-assorted material. The Clyde soils are extensive and widely distributed and have an important influence on the agriculture of the county. Four types, the Clyde loamy fine sand, fine sandy loam, loam, and silty clay loam, the last named type having a heavy phase, are mapped in White County.

The Plainfield series includes brownish-gray to brown or yellowish-brown surface soils and yellowish-brown to grayish and brown mottled subsoils of similar to somewhat heavier texture. The topography is level to undulating and gently rolling and the drainage is fair to rather excessive. The Plainfield soils are derived from sedimentary deposits laid down on the floor and along the shores of glacial lakes, the soil-forming material being essentially noncalcareous. The fine sand, with a rolling phase, is the only member of the series mapped in White County.

The surface soils of the Fox series are grayish brown to brown and the subsoils are yellowish brown to slightly reddish brown and rest upon stratified beds of gravel and sand, a large percentage of which is limestone. These soils occupy terraces and outwash plain areas, level to undulating in topography and naturally well drained. In this county only one type was mapped—the Fox fine sandy loam.

The Genesee series includes dark-brown to grayish-brown surface soils, with somewhat lighter brown subsoils. The soil-forming material is recent alluvium occupying a first-bottom position along streams. Only one type—the Genesee fine sandy loam—is mapped in White County.

Muck was formed from the decay of the heavy growth of vegetation in the old ponds and marshes and was formerly covered with water most of the time.

The name and the actual and relative extent of each of the soil types mapped in White County are given in the following table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Brookston silt loam	64,256	19.8	Carrington silt loam	12,608	3.9
Clyde fine sandy loam	54,784	16.9	Clyde loamy fine sand	6,656	2.0
Plainfield fine sand	9,536	14.2	Miami loam	5,248	1.6
Rolling phase	36,608		Carrington fine sandy loam	4,352	1.3
Clyde silty clay loam	33,472	10.6	Bellefontaine silt loam	4,288	1.3
Heavy phase	832		Muck	3,520	1.1
Miami fine sandy loam	24,064	7.4	Genesee fine sandy loam	3,328	1.0
Carrington loam	3,904	7.2	Bellefontaine loam	1,856	.6
Flat phase	19,328		Fox fine sandy loam	1,664	.5
Clyde loam	18,048	5.6	Total	324,480	
Miami silt loam	16,128	5.0			

MIAMI FINE SANDY LOAM.

The surface soil of the Miami fine sandy loam, to an average depth of 7 inches, is a grayish-brown fine sandy loam or loamy fine sand, though in places the first inch or two may be decidedly dark colored. The subsoil consists of a light-brown or yellowish-brown fine sandy loam, passing at about 18 inches into a yellowish-brown, sticky fine sandy loam or clay loam. In some places the substratum is heavy glacial till and elsewhere it consists of sandy material. In a few instances this soil may be derived from the weathering of sandy till, but in most cases it seems to be the result of sands blown from the lake region and deposited over the heavy glacial drift. Many of the areas in the northern part of the county have deeper sandy soils, sandy clay loam subsoils, and a deeper sand substratum. Had they been large enough some of these areas would have been mapped as Plainfield fine sandy loam.

The most extensive development of this type occurs along the southern border of the lake plain and along the Tippecanoe River, north of Monticello. Some areas lie in the forested country south of Monticello and small ones are scattered throughout the northern part of the county. The topography is level to undulating and the areas are elevated slightly above the adjoining Clyde soils. The natural drainage is fair and artificial drainage usually has been supplied where necessary.

The Miami fine sandy loam is fairly important in the northeastern quarter of the county, as it is one of the better, light-colored sandy soils. Probably 85 per cent of the type is cultivated, corn, wheat, and oats being the principal crops grown. It is often difficult to get a good stand of clover on such land.

Corn and oats yield ordinarily about 30 bushels per acre, though in the best seasons some fields produce as much as 50 bushels per acre. Wheat averages 15 bushels per acre and sometimes does much better. When a good stand of clover is obtained the hay yields approach 1 ton per acre.

This type of soil is easy to cultivate. It does not clod or show other physical impairment if plowed wet. It responds quickly and well to applications of manure or other kinds of organic matter. Rye is sometimes used as a green manure. Applications of 100 to 150 pounds of complete fertilizer are generally used with wheat and corn. This stimulates the early growth of corn, and is especially valuable where planting has been delayed.

This type usually occurs in association with sandy types of the Clyde series and the land values depend on the relative proportion of the several soils and the distance from town. Ten farms in the county containing more or less Miami fine sandy loam and of an average size of 116 acres were sold in 1915 for $120 an acre.

The Miami fine sandy loam can be improved by the same methods of treatment as the other types of the Miami series. The abundant growth of sorrel on much of this type indicates an acid condition, which is borne out by analyses made at the Purdue Experiment Station. Tests have shown that from 3,000 to 4,000 pounds of ground limestone are required to neutralize the acidity of an acre-foot of some light sandy soils. Liming would aid the growing of leguminous crops, which are valuable as a source of organic matter and nitrogen.

MIAMI LOAM.

The surface soil of the Miami loam, to an average depth of 8 inches, is typically a light grayish brown loam or silty loam. The subsoil is a light yellowish brown, heavy loam, grading into silty clay loam or clay, usually somewhat mottled with gray and brown. The substratum consists of unweathered, somewhat calcareous glacial till. As it occurs in White County this type is transitional between the Miami silt loam and the sandy soils of the county and is quite variable in color and texture. The surface ranges from gray to brown and in places consists of fine sandy loam and silt loam. The subsoil is always heavy and sometimes is very compact and impervious and gray in color. The areas with a light-grayish surface soil and a gray subsurface layer are really the Crosby loam, but are too limited in extent to justify a type designation.

The Miami loam has its largest development in an area just northeast of Monticello. Other areas are scattered throughout the timbered section south of Monticello, and also along the junction of the sandy and "clay" lands. Very little of this type occurs in the northern half of the county.

The topography is prevailingly level to gently rolling, but some narrow strips occur on steep valley slopes. In many places this type is slightly elevated above the adjoining soils. The natural surface drainage is fair to good, but the flat areas where the subsoil is compact are much improved by open ditches and tile drains.

The Miami loam is an inextensive type, but is well improved and fully utilized. It corresponds closely to the Miami silt loam in crop adaptation and productiveness. Corn, oats, wheat, and clover are the principal crops. Wheat and clover do better on this soil than on soils of the Carrington and Clyde series (black land). There are several dairy farms on this type and some hogs and cattle are fattened on most of the farms. The manure obtained from this source is an important factor in maintaining the productiveness of the soil.

Corn and oats usually yield 35 bushels, wheat 20 bushels, and clover 1 ton of hay and a bushel of seed per acre, but these yields are occasionally doubled in good seasons.

The Miami loam is cultivated and fertilized in practically the same way as the silt loam, but is somewhat easier to handle, owing to its more sandy surface soil.

Owing to its productiveness and the location of much of it near towns, this is a highly valued soil type and seldom changes hands. Two farms consisting partly of this type and partly of black land sold for $111 and $150 an acre in 1915. Some well-improved land near towns could not be bought for $200 an acre. Owing to the small size of many of the areas, its value is influenced largely by that of the surrounding types.

The Miami loam responds to the same methods of improvement as the silt loam of the series.

MIAMI SILT LOAM.

The surface soil of the Miami silt loam, to a depth of 6 to 10 inches, is a light grayish brown, smooth, moderately friable silt loam. The subsoil consists of a yellow or light yellowish brown silt loam, grading into silty clay loam at a depth of about 20 inches, which in turn passes at some point above 3 feet into a compact, gritty, yellowish-brown clay loam. Underlying the subsoil and extending to a great depth there is a substratum consisting of unconsolidated and unweathered glacial débris containing bowlders, rocks, sand, and clay. The lower subsoil and the substratum are moderately calcareous.

There are two variations of the Miami silt loam in White County which are not extensive enough to warrant separation. One of these occurs in flats and is characterized by the light-gray color of the surface soil, the surface being almost white when dry. The subsoil is mottled with gray and yellow and in many places is a compact, impervious silty clay at a depth of 24 to 30 inches. The other varia-

tion occurs along the valley slopes, where the topography is more rolling and the soil is oxidized to greater depths than usual. It is similar in color to the Bellefontaine soils.

The Miami silt loam is found principally along the Tippecanoe River from Monticello southward and in the lower courses of the larger creeks. It also includes a part of the land east of Monticello and south of the Pennsylvania Railroad, as well as a few isolated areas in the southwestern corner of the county. All the type formerly supported a forest growth consisting mainly of hickory, oak, maple, and walnut.

The topography is prevailingly gently undulating to rolling. There are ridges with intervening areas of black land and level land dissected by streams. This type has better natural surface drainage than any of the other soils in the county except those of the Bellefontaine series, but underdrainage is somewhat retarded by the compact structure of the subsoil.

The Miami silt loam was the first soil to be used for agriculture in White County. While not very extensive, it includes some of the best farms in the county and is valued highly. About 90 per cent of the type is cultivated, with the remainder in woodlots and pastures. Corn is the principal crop grown on this soil, and it is recognized as one of the best soils in the county for timothy, wheat, and clover. Oats also are largely grown. These five crops are the only ones produced on a commercial scale. There are a number of apple orchards on this type, but, with one exception, they are given little attention and return little income. The trees make good growth, and the indications are that fruit growing might be made profitable on this soil.

All the farmers keep some hogs, and more cattle are fed on this type than on any other in the county. Some sheep also are raised and fed. Some of the rougher areas of this type along streams are in permanent bluegrass pasture. Several of the dairies supplying milk to Monticello and other towns are located on the Miami silt loam.

Where its fertility has been maintained by the growing of leguminous crops and the addition of manure, the Miami silt loam produces large yields. Corn yields ordinarily 35 to 40 bushels per acre, and in very good seasons as much as 75 bushels. Wheat yields about 20 bushels per acre under average conditions and occasionally double that quantity in some fields. The ordinary yield of oats is about 35 bushels per acre, but in the exceptional season of 1915 some fields produced over 75 bushels per acre in spite of severe damage in the shock. The yield of hay from both clover and timothy is usually 1 ton per acre. Rye is occasionally sown. The yield is usually about 15 bushels per acre. One field of rye and vetch, observed in the course of the soil survey, produced over 2 tons of hay per acre.

The Miami silt loam requires and receives rather careful treatment. The soil forms into clods if trampled by stock or if plowed when too wet, but can be kept in good tilth when properly cultivated. Some commercial fertilizer is used with corn, wheat, and oats. Usually a mixture containing 2 per cent nitrogen, 8 per cent phosphoric acid, and 4 per cent potash is used, in applications of 100 to 200 pounds per acre. Other formulas in use are 2–10–2, 2–10–4, and 2–8–2. Most farmers prefer to build up their land by plowing under leguminous crops and stable manure. The practice of keeping live stock to help supply organic matter is general.

Land of this type is valued at $125 to $200 or more an acre, according to farm improvements and distance from towns. The type seldom changes hands. Two farms composed partly of this type were sold in 1915 for $145 and $150 an acre.

Methods of improving this type include the tile drainage of the flatter areas and the keeping and feeding of more live stock. The manure is a cheaper source of nitrogen than commercial fertilizers, and also supplies other fertilizing elements. Tests by the Indiana Experiment Station show that this type usually is slightly acid. Applications of 1,000 pounds or more per acre of agricultural lime would be beneficial, especially in insuring a catch of clover, and are very necessary if alfalfa is to be grown. Cowpeas and soy beans might be used where clover fails. Experiments at Purdue indicate that stubble ground can be disked or plowed immediately after wheat cutting and sown to cowpeas to use for hay or to be pastured and plowed under. The yield of hay in such cases has usually amounted to nearly a ton per acre.

BELLEFONTAINE LOAM.

The Bellefontaine loam consists of a light-brown to reddish-brown loam or silty loam about 10 inches deep, underlain by a reddish gravelly clay loam or clay which becomes more gravelly and looser in the lower part. The substratum is gravelly or stony till like that underlying the Bellefontaine silt loam. There are many gravel pits in this type, the material of which contains considerable clay and makes better roads than that from "water-gravel pits," but usually is not so suitable for concrete.

The principal areas of this type are scattered through the rougher, timbered sections around Brookston and Chalmers. Long and very narrow strips occur on some of the more pronounced slopes along the Tippecanoe River as far north as Norway, as well as along some of the creeks. Other areas occur on the rougher slopes of the moraines, and a few are relatively smooth. The surface drainage is good to excessive and some of the steeper slopes are subject to erosion.

The Bellefontaine loam is very inextensive and only about 50 per cent of it is cultivated. The steep stream slopes are either left in forest or used as pasture land. Corn, wheat, oats, and rye are grown on the smoother areas. Corn and oats yield 20 to 25 bushels and wheat and rye 10 to 12 bushels per acre under ordinary conditions.

This type usually constitutes only a small part of farms and is cultivated and fertilized in the same manner as the soils in association with which it occurs. It is probably worth about $100 to $150 an acre.

Most areas of this type could more profitably be used for the production of grasses, wheat, and rye than for corn and oats. Alfalfa or rye and vetch would protect the land from erosion and improve the soil. Some areas are well suited for use as woodlots or orchards.

BELLEFONTAINE SILT LOAM.

The surface soil of the Bellefontaine silt loam consists of a brown, friable silt loam, grading at about 10 inches into a bright yellowish brown to reddish-brown silt loam, which extends to a depth of 15 to 18 inches. The subsoil is a reddish-brown silty clay loam, grading at about 20 to 30 inches into a compact, gritty or gravelly clay loam, which passes abruptly into a substratum consisting of gravelly or stony till carrying a high percentage of limestone material. In places the substratum is partially stratified, and it contains numerous gravel pits.

The Bellefontaine silt loam is confined to the timber belt east of Brookston and Chalmers. The topography ranges from smoothly rolling to undulating. Although uneroded, the surface is rougher than that of most of the types in the county. The drainage and aeration of this type are good because of its topography, its gravelly substratum, and its general proximity to streams. The gravel is not near enough the surface to make the soil droughty.

This type is derived from the weathering of glacial débris piled in terminal moraines and from ground moraine in an advanced stage of oxidation. It was originally forested. It is commonly called "chocolate-clay land" and is generally valued more highly than the whitish or yellowish clay soils mapped in the Miami series. About 85 or 90 per cent of the type is cultivated and the remainder is in woodlots and pastures. Its total area in White County is relatively small.

The Bellefontaine silt loam is handled in practically the same way as the Miami silt loam. Corn, oats, wheat, and clover are grown and stock raising is relatively important. The natural productiveness and value of the soil are slightly greater than those of the Miami silt loam.

Although this soil is at present well improved, it might be further improved by the use of the same methods that have been found profitable on the Miami silt loam.

CARRINGTON FINE SANDY LOAM.

The surface soil of the Carrington fine sandy loam is a dark-brown, mellow or loose fine sandy loam, with an average depth of 14 inches. The subsoil is a brown fine sandy loam or loam, grading into a yellowish-brown fine sandy clay loam. In places the heavy subsoil is not encountered within 3 feet of the surface. The substratum consists of till which in places is of a sandy nature. Some of the areas around Monon and Lee are underlain by limestone at shallow depths.

The Carrington fine sandy loam occurs around Wolcott and in some spots of well-drained sandy prairie scattered through the lake plain in the northwestern part of the county. The topography is level to gently undulating. Some areas are slightly elevated above the surrounding prairie and others are transitional between the heavier prairie and the sandy lake-plain soils. Drainage is usually well established.

This type is the most inextensive and the least desirable of the prairie soils, except where it approaches and merges into the Carrington loam. It is largely utilized for farming, corn, oats, wheat, and clover being the principal crops. Stock raising and dairying are carried on to only a small extent.

Average yields are generally somewhat lower on this type than on the Carrington loam. The areas with a limestone substratum are slightly more productive than the remainder of the type.

The Carrington fine sandy loam is handled like the other prairie soils. It is easier to cultivate under wet conditions than the heavier soils. Fertilizers and manure are not largely used.

The value of land of the type varies greatly, depending on the character and relative extent of the associated soils. Where it occurs in association with the Carrington loam it is held at $60 to $150 an acre.

Crop yields on this type could be materially increased by the plowing under of manure or leguminous crops and the application of fertilizers. This is a good trucking soil and could well be more extensively used for potatoes, as most of the crop could be sold in the home markets.

CARRINGTON LOAM.

The surface soil of the Carrington loam consists of a black loam of variable texture and about 12 inches deep. The subsoil is a yellowish-brown, heavy loam to clay loam, somewhat mottled with gray and brown, and becoming lighter textured and brighter colored

with depth. The surface soil may effervesce slightly with acid, while the subsoil usually gives strong reaction, indicating the presence of calcium carbonate in considerable quantities. In local spots the soil mantle is only 2 or 3 feet deep and rests directly upon limestone, and throughout the type a substratum of limestone occurs at a depth of 20 feet or less. Between and along Monon and Little Monon Creeks where erosion has removed more of the old lake-plain deposits, the bedrock is within about 8 feet of the surface. Experienced tile ditchers say that there are probably 100 acres of land in this neighborhood where the depth to rock averages 30 inches, but the substratum was very seldom encountered with a 3-foot soil auger. The rock is exposed in several dredged ditches, in outcrops along the creeks, and in the stone quarry just south of Monon. The rock does not seem to be weathered and the overlying soils do not seem to be residual. Glacial bowlders occurring on the surface of the land are of granite, not limestone.

The main development of this type is in Monon Township. The topography is level to gently undulating. The type was originally a moist prairie, except for some thinly forested areas near the creeks. The surface drainage was naturally only fair, but it has been improved by dredged ditches and tiling. In places it was necessary to blast the limestone from the ditch bottoms, and rock sometimes interferes with the laying of tiles.

Although this type has a rock bottom, in only a very few places is the soil so shallow as to make cultivation unprofitable. Corn is more likely to suffer from this cause than any other crop. Most of the type is under cultivation. Corn, oats, and wheat are the principal crops.

Corn and oats yield ordinarily about 30 to 35 bushels per acre, but on some farms under favorable conditions much larger yields are obtained. The average yield of wheat is about 20 bushels per acre. Some of the better fields produced 40 bushels per acre in 1915.

This soil is handled like the other heavy-textured prairie types, but more commercial fertilizer is needed and used.

Most of the Carrington loam lies near towns and its value is increased thereby. The price of farm land ranges from $100 to $175 an acre.

Carrington loam, flat phase.—The surface soil of the Carrington loam, flat phase, is a dark-brown to almost black, mellow loam, 12 to 16 inches deep. The subsoil consists of a brown loam, grading abruptly into a yellowish-brown clay loam, mottled with gray and brown. In places there is a slight veneer of fine sand on the surface and the substratum may be sandy. This type merges gradually into the adjoining Carrington silt loam and fine sandy loam, so that there is no distinct line of demarcation.

The Carrington loam, flat phase, is a prairie soil occurring most extensively around Wolcott, where it is partly surrounded by the fine sandy lake-plain soils. The topography is flat to gently undulating. Natural drainage is poor, but all surplus water is now removed by tile drains and open ditches.

Though relatively inextensive, this phase includes very little waste land and is important. Like the other prairie soils, it is used principally for the production of corn and oats. A few farmers also grow clover and raise live stock.

In crop yields this soil equals the Carrington silt loam. This phase is handled in the same manner as the other prairie soils. It is easier to plow and cultivate than the silt loam and is practically as productive and as durable as the latter type.

The value of the Carrington loam, flat phase, is slightly affected by its association with poorer sandy lands. In 1915 eight or ten farms consisting largely of land of this phase were sold at prices ranging from $62 to $175 an acre.

This soil responds to the same methods of improvement as the other Carrington soils.

CARRINGTON SILT LOAM.

The surface soil of the Carrington silt loam is a dark-brown to nearly black, mellow silt loam, with an average depth of about 10 inches. When wet, the soil is black and when dry the surface of plowed land is quite brown. The subsoil is a brown silt loam, passing at about 14 to 16 inches into a yellowish-brown silty clay loam, which becomes slightly gritty below 30 inches. The substratum consists of grayish, slightly calcareous bowlder till containing some beds of sand and gravel.

This type is developed only in the prairie section of White County, the principal areas occurring on the smooth, morainic ridges of Round Grove, Prairie, West Point, and Big Creek Townships. The topography varies from gently undulating to rolling and is well suited to the use of farm machinery. The soil is naturally very well drained, although some of the flatter areas have been improved by tiling.

The Carrington silt loam was the first prairie soil to be used for farming in White County, as there was no danger of crops drowning out even before ditches were dug. Practically all of it is in cultivated fields or farm yards. Corn and oats are the principal crops grown. Clover is sometimes sown, and where a good stand is obtained is cut for hay. Wheat and other crops are rarely grown on this soil. Hogs are kept on most farms and some cattle and sheep are fed. Dairying is undeveloped.

Corn and oats yield ordinarily over 35 bushels per acre. These two crops have been grown exclusively on some fields for more than 50 years without the use of commercial fertilizer and with the addi-

tion of little organic matter. In such cases the average yields have decreased 5 to 10 bushels per acre. On farms on which live stock is raised and clover sown occasionally the crop yields are maintained at a high level. Farmers are beginning to realize that this land may deteriorate and are endeavoring to build it up and keep it in a productive condition. Some commercial fertilizer is applied to corn by means of the planter attachment.

Land of this type ranges in value from $150 to $250 an acre, according to improvements and location. It is seldom offered for sale. Two farms composed partly of this type and partly of black prairie land (Clyde series) were sold in 1915 for $140 and $217 an acre, respectively.

Although Carrington silt loam contains much organic matter, it is benefited by the addition of manure or the growing of clover and other leguminous crops, owing to the supply of nitrogen thus made available. More live stock should be kept and the additional manure returned to the soil. An application of 100 to 200 pounds per acre of a fertilizer mixture containing 8 to 10 per cent phosphoric acid and 2 to 4 per cent of soluble potash usually gives good results with corn. While the same fertilizer increases oat yields, the price received for oats is not large enough to insure a profit over the cost of the fertilizer. However, it will aid in getting a stand of clover on the oat land. Ground phosphate rock gives fairly satisfactory results for two or three years after it is applied. Acidity tests show that this soil is neutral or only slightly acid. Limestone would not be needed for most crops, but on the thinner soil would benefit clover or alfalfa.

BROOKSTON SILT LOAM.

The surface soil of the Brookston silt loam is a dark-brown to almost black silt loam, 12 to 16 inches deep. The subsoil is a yellowish-brown and gray, indistinctly mottled, silty clay loam, changing to a brighter yellowish brown and gray mottled, friable silty clay loam at a depth of about 30 inches. The underlying till is moderately calcareous. As mapped, this type includes small areas of Clyde silty clay loam and also slightly better drained spots where the subsurface material is brownish gray and the deeper subsoil is mottled with gray. It is seldom possible to draw a sharp boundary between this type and the Carrington silt loam on the one hand and the Clyde silty clay loam on the other.

The Brookston silt loam is confined to the prairie region of the southern half of the county, and is also mapped around Wolcott, where it resembles and merges into the flat phase of the Carrington loam. The topography is flat to very gently undulating, with a few slight elevations and depressions. The drainage is naturally poor, and some areas were formerly quite marshy during rainy

seasons. At present the type is well provided with dredged outlets and with thousands of rods of tile drains, so that the crops are in no danger of drowning.

This type is the most important and extensive soil of the prairie region and one of the most important in the county. It is entirely utilized for agriculture and is devoted mainly to the production of corn and oats. Only a few farmers attempt to grow clover or any other hay crop. Sometimes small pastures are provided for work stock, but as a rule the animals are turned out on stubble or in stalk fields. For some years stock raising was neglected on the prairie land, but there is a tendency now to feed more cattle and sell less of the crops.

Ordinarily corn and oats yield 40 bushels per acre on this soil, and in favorable seasons many farmers obtain as much as 60 bushels per acre.

The average size of farms on this type is large and the land lies ideally for carrying on operations on a big scale. Gang plows, 2-row cultivators, and other large-sized implements make up for the deficiency in labor. The land is broken deeply and well cultivated. Corn usually is clean cultivated, though this is difficult in very wet seasons. In some fields gopher vine, smart weed, and other weeds are very troublesome. Commercial fertilizers are not used and little effort is made to maintain soil fertility, though up to the present time crop yields do not appear to have decreased from this cause. However, owing to its poorly drained condition before artificial drainage was established, much of this soil has not been farmed regularly over 25 years and some virgin sod was broken less than 15 years ago.

In recent years the price of this land has risen greatly and trading in it has been brisk, though at the time of the survey little of it was on the market. Six farms consisting partly of this type and partly of the Clyde silty clay loam, and averaging 140 acres in size, were sold in 1915 for $97 to $228 an acre, while six other farms containing the Brookston silt loam in association with the Carrington loam sold at somewhat lower prices. The price of land of this type in Round Grove Township may be slightly lower than the prices quoted, owing to the distance from railroads.

While this is naturally a very strong soil, experience has shown that any soil will deteriorate if cropped exclusively to corn and oats, and to guard against decline of yields the content of organic matter should be maintained by the incorporation of manure and green-manure crops, preferably legumes. Owing to the high price of land, it does not return a high rate of interest on the amount of money invested in it under the ordinary methods of farming, and it should therefore be farmed more intensively.

CLYDE LOAMY FINE SAND.

The surface soil of the Clyde loamy fine sand is a dark-gray to black loamy fine sand or fine sand with an average depth of 14 inches, and usually containing 6 per cent or more of organic matter derived from marsh grasses. The subsoil consists of a gray to brownish-gray loamy fine sand, changing abruptly to a light-gray, loose fine sand. In places there is a silty layer a few inches thick in the subsoil. Underlying the subsoil to a great depth is a substratum consisting of loose grayish and brownish sand.

A variation of this type in which the soil is acid occurs in places, especially along the line of contact with the Plainfield fine sand and its rolling phase. Here the surface soil is shallower and lighter colored and the subsoil contains more brownish mottlings than usual. Dewberries and huckleberries are commonly found on this variation, and there is often a sparse growth of pin and blackjack oak.

The Clyde loamy fine sand is confined to the sandy lake plain region in the northern half of the county, occurring in association with the Plainfield fine sand and the rolling phase of this type. The largest and most typical areas are in the northeastern part of the county.

This type occupies slightly depressed areas or marshy flats surrounded by sandy ridges. The topography is level to very gently undulating and the natural surface drainage is poor. Although the subsoil and immediate substratum are quite porous, there are impervious strata at lower depths which keep the water table within 36 to 50 inches of the surface, and the soil is seldom droughty. Artificial drainage has been provided over most of the type.

This type is one of the less desirable of the black-land types. It is relatively inextensive, comprising but 2 per cent of the total area of the county. Probably 60 to 70 per cent of the type is now cultivated, the remainder being used for pastures. The pasture land usually is covered with marsh grasses. In many places there is a growth of pin and blackjack oaks, quaking aspen, dewberry, and blackberry. Corn and oats are the principal crops. Wheat and hay are of secondary importance. Some cattle and other live stock are grazed.

Crop yields have a wide range, varying according to seasonal conditions and minor variations of the soil. Corn and oats yield from 15 to 40 bushels per acre, with an estimated average of 23 bushels. Wheat yields ordinarily about 10 bushels, and hay a little less than a ton per acre.

The methods of cultivating and fertilizing this soil are similar to those followed on the Clyde fine sandy loam.

Some of the better areas of the Clyde loamy fine sand are valued almost as highly as the Clyde fine sandy loam, while other less productive areas located far from the towns have a much lower value. In

1915 eleven farms composed partly of this type sold at prices ranging from about $25 to $150 an acre.

This soil responds to the same methods of improvement as the Clyde fine sandy loam. Analyses and field experiments show that the acid land would be benefited by applications of lime.

CLYDE FINE SANDY LOAM.

The Clyde fine sandy loam consists of a black fine sandy loam or loamy fine sand 10 to 15 inches deep, underlain by a light-drab, sticky fine sandy loam or loam mottled with brown and drab, and grading into loose fine sand at some point below 30 inches. Along the lower border of the lake plain the subsoil and substratum often consist of heavier glacial till.

This type is scattered throughout the lake-plain region of the county. The surface is very flat, and lower than that of the surrounding light sandy soils. The naturally poor drainage has generally been improved by means of ditches and lines of tile. Although the substratum is very porous, the water table stands near the surface and prevents the land from being droughty.

The Clyde fine sandy loam is the most extensive and important soil type of the lake-plain region of northwestern Indiana. In this county probably 85 or 90 per cent of the type is cultivated, the remainder being used as pasture land and for the production of marsh hay. Corn and oats are the most important crops. The soil is probably the best of the light-textured black lands for wheat and some of that grain is produced. Clover, rye, timothy, and buckwheat are rarely sown. Large herds of feeding steers were observed on this type in 1915. One farm was carrying 1,000 head of hogs besides a large number of cattle.

It is claimed by some farmers that the black sandy land, when properly drained, produces better yields than the prairie soils in dry seasons. In its present condition the type gives average yields of 30 bushels of corn, 18 to 20 bushels of wheat, and 1 ton of timothy hay per acre.

This type is handled like the other black lands devoted to corn and oats. The land can be plowed when very wet without injury. Potash fertilizer is applied to corn, especially where the surface soil is mucky.

In 1915 at least 45 farms composed partly of this type were sold in White County, the prices ranging from $50 to $210 an acre. One farm composed entirely of this type sold for $150 an acre, while another brought $187.

Over much of the Clyde fine sandy loam the principal need is more thorough drainage. Experiments in fertilizing oats made by Purdue

University on a field northwest of Monon containing alkali spots showed that potash was badly needed and phosphoric acid was beneficial, but that it was useless to apply nitrogen. Acidity tests show this black sandy land to be neutral or alkaline in most cases. In experiments with corn an increase in yields of 10 to 20 bushels per acre has been obtained by the use of potash on the mucky areas of this type. The quality of the grain also is greatly improved by proper fertilization.

CLYDE LOAM.

The Clyde loam, where typically developed, consists of a black loam somewhat variable in texture, underlain at an average depth of about 12 inches by a drab clay loam, which passes abruptly into a light-gray, semiplastic and sticky clay loam, slightly mottled with brown. In places the surface soil consists of a fine sandy loam, and in others it is slightly mucky. In areas of this type in the southern and central parts of the county the deep subsoil and substratum usually consist of grayish mottled, calcareous clay loam, clay or stony till. In the northern part of the county, well within the lake plain, the substratum is usually sandy.

The type includes typical lake marshes and also prairie land which was originally covered with a veneer of sand and encircled by sand ridges. In some places where borings were made the material closely resembled the Carrington loam, flat phase.

Most of the type occurs in the northern half of the county, especially west of the Tippecanoe River, though a few areas are encountered in the southern part. The topography is flat and the surface somewhat lower than that of surrounding soils. Natural drainage is poor and it is necessary to establish artificial drainage before the type can be successfully cultivated.

The Clyde loam is often called "willow land." It includes much of the best soil of the lake plains, and all of it is used for farming. Corn and oats are the principal crops, a very small acreage being devoted to wheat and clover. The type formerly was entirely devoted to grazing and the production of marsh hay, but now only the wettest areas are generally used for those purposes. Some cattle are raised and fed on the Clyde loam.

Under the most favorable conditions corn and oats yield as much as 70 bushels and wheat 35 bushels per acre, but the average yields are only about half these quantities. During periods of excessive rainfall crops are likely to be drowned out on some of the lowest lying fields.

This type is cultivated and fertilized in the same manner as the other black lands of the county where grain growing is the principal industry.

Eight large farms consisting of this type and the Clyde fine sandy loam sold in 1915 at prices ranging from $90 to $210 an acre, while several other farms which included some light sandy land sold at $85 to $130 an acre, and two farms consisting of the Clyde and Miami loams brought $111 and $150 an acre.

Much of the Clyde loam could be further improved by deepening drainage outlets and laying tile 50 to 100 feet apart. "Bogus" spots and mucky areas should be fertilized with potash and phosphoric acid. Straw and manure are also beneficial, but they are needed more on light sandy land. Early maturing varieties of corn should be grown to avoid danger of early frosts. Seed should be selected from mature plants before the general harvest time and stored in a dry place for the winter. It would doubtless be found profitable to grow more legumes and utilize more of the grain in the production of beef or pork.

CLYDE SILTY CLAY LOAM.

The surface soil of the Clyde silty clay loam is a dark-brown to black silty clay loam about 16 inches deep. At the immediate surface the material is usually loose and friable, owing to the organic matter present, and in the lower part it is still darker and slightly plastic. The subsoil is a grayish, calcareous silty clay loam to silty clay, mottled more or less with rusty brown and yellow in the lower part, and containing some small, white lime concretions. The substratum may consist of grayish, heavy till or of beds of brownish sand and fine gravel, as shown at the clay pits west of Chalmers. Where it is associated with the Miami soils the boundaries of this type are usually well defined, the surface soil being grayish black in color and heavier in texture than usual. In the prairie region the boundaries between the Brookston silt loam and the Clyde silty clay loam are often arbitrary, as the two soils merge gradually into each other. There is often more structural than textural difference between them.

This type is confined mainly to the southern half of White County where it occurs in association with the Miami, Brookston, and Carrington soils. Some areas occur to the north of Reynolds and elsewhere in the sandy lake plain. The surface is very flat and slightly lower than that of the surrounding soils. The type was formerly marshy and was covered with water during a part of the year, but most of it is now traversed by dredged ditches and open and tile drains, so that crops are assured in wet seasons.

The Clyde silty clay loam is one of the strongest and best soils in White County and throughout central Indiana. It comprises 10.3 per cent of the land area of the county. All the type is used for agriculture, corn and oats being the main crops grown, with occasional fields of timothy and clover. Some of this type supports

bluegrass pasturage, which is highly valued by stockmen. Animals are grazed and fed on this land more because of the heavy growth of grass than for the purpose of improving the soil.

On well-tiled farms this type is expected to yield 40 bushels of corn or oats per acre. In exceptionally wet seasons it may not do so well as the Carrington silt loam. Clover makes very good yields if a good stand is obtained and it is not winterkilled. Several fields of red clover observed in 1915 gave promise of yielding nearly 2 tons of hay per acre. Clover seeded the same spring caught very well. Timothy makes a rank growth and sometimes yields over 2 tons of hay per acre. Average yields of all crops may be doubled in the most favorable seasons.

The Clyde silty clay loam is handled in the same way as the Carrington soils. Great care must be taken to avoid putting it in bad physical condition by plowing when too wet. Cultural operations are more difficult on this type than on the lighter and more loamy soils. As most of the land has been under cultivation for only a short time, fertilizers are not used on it.

This type, when well drained, is one of the highest priced soils in the county. It comprised a part of 10 farms that were sold in 1915 at prices ranging from $100 to $228 an acre. Much of this soil lying west of Chalmers could not be bought for $250 an acre.

Some areas of this type can be improved by more thorough drainage. Sometimes so-called "bogus" or "alkali" spots are encountered in this and other heavy prairie soils. Such spots are characterized by white incrustations of salts on the surface and by the poor growth of corn. The salt is probably lime sulphate in most cases. Chemical analyses and fertilizer experiments indicate that the "bogus" condition is caused by acidity and lack of available phosphoric acid and sometimes of potash. These elements should be supplied in fertilizers. Applications of straw and manure and better drainage are also beneficial. Liming may be needed in these spots, but most of the type is alkaline or neutral. A very good field of alfalfa observed east of Chalmers on this land suggests that a greater acreage should be sown.

Clyde silty clay loam, heavy phase.—The surface soil of the Clyde silty clay loam, heavy phase, consists of black silty clay, about 12 to 20 inches deep. In places the immediate surface is slightly lighter textured than usual. The soil is fairly plastic and smooth, and when dry it becomes very hard and cracks deeply. In some places it passes abruptly into a light-gray subsoil; in others it grades through a drab silty clay into a gray, plastic, sticky clay, mottled with rusty or reddish brown. Lime concretions are usually found in the subsoil, which effervesces with acid. The substratum consists of gray clay, till or brownish sandy strata.

This phase occurs in a few small areas north and northeast of Chalmers. The topography is flat, as this soil occupies the lowest part of the depressions in which the main type is developed. The drainage is not so well established as on the typical silty clay loam, although much of the phase is ditched and tiled.

The heavy phase is used mainly for the production of corn and oats and as pasture land. It is more difficult to cultivate than the main type, but produces similar yields and brings as high prices.

Early varieties of corn should be planted on this as well as on all the other Clyde soils, in order to avoid possible injury from frost.

PLAINFIELD FINE SAND.

The surface soil of the Plainfield fine sand to an average depth of 8 inches is a grayish-brown or light-brown fine sand. In places the surface inch or two is dark colored and loamy. The subsoil is a light yellowish brown, loose fine sand containing slight mottlings of gray, which usually become more pronounced with depth. Some spots are almost orange colored. Occasionally there may be a thin layer of fine sandy loam in the subsoil, but the loose sand extends to a great depth.

The Plainfield fine sand occurs only in the northern part of White County. The areas are usually small, seldom containing more than 300 acres, and are most numerous in the northern tier of townships. They generally occur in positions intermediate between the black lands and the sand ridges.

The topography is flat to very gently undulating. As the type is slightly elevated above the marshy land, it is naturally well drained as a whole. In some of the flatter areas, where the water table formerly stood near the surface, drainage has been improved by ditching.

This type comprises 2.9 per cent of the area of White County. It is not so good a soil as the black lands, but is better than the Plainfield fine sand, rolling phase. It originally supported a forest growth of pin, blackjack, red, and white oaks, and aspen, with an undergrowth of briers, hazel brush, and mosses. Probably 80 per cent of the type is now cultivated, corn, oats, and wheat being the principal crops grown. The uncleared areas are used as pasture land. In 1915 a number of small fields of cowpeas were observed, which were doing fairly well. Some rye is grown.

Ordinarily corn and oats yield about 20 bushels per acre, but in favorable seasons, with proper cultivation and fertilization, much larger yields have been obtained. Wheat and rye generally yield about 10 bushels, and timothy about three-fourths of a ton of hay per acre. Cowpeas are still in the experimental stage in White County, but often yield a ton of hay per acre.

The Plainfield fine sand is a very easy soil to cultivate, because of its loose structure and well-drained condition. The sandy surface soil forms an effective mulch, which conserves moisture very well in dry weather. It is the general practice to put all the available manure on this land. For corn and wheat an acreage application of 100 to 200 pounds of a fertilizer mixture consisting of 2 per cent nitrogen, 8 to 10 per cent of phosphoric acid, and 2 to 4 per cent of potash usually is made. Rye is sometimes plowed under as a green manure.

Farms composed partly of this type sell for $25 to $150 an acre, depending on the proportion of black land and sand ridges which they contain and on distance from town. If sold alone, the type would bring about $50 to $100 an acre.

The Plainfield fine sand is a soil which can be built up and improved in many ways and could be more extensively used for trucking, although there are no city markets near. According to acidity tests made by the Purdue University on land of this general character, applications ranging up to 2 tons or more of ground limestone would be necessary to neutralize the acidity in an acre-foot of soil. The abundant growth of dewberries, red sorrel, and cinquefoil indicate the general sourness of the soil. An analysis of a sample of this soil taken in sec. 25, R. 2 W., T. 28 N., showed less than 2 per cent organic matter and 0.08 per cent nitrogen. Strong acid extracts gave 0.06 per cent phosphoric acid (P_2O_5) and 0.03 per cent potash (K_2O), although there was 1.44 per cent total potash. There was 0.33 per cent lime and magnesia, but they were not in the carbonate form, and 1,470 pounds of limestone would be needed to correct the acid in an acre-foot. These figures show the great need of organic matter and nitrogen. By liming the land clover could be grown to supply this deficiency, but cowpeas can be successfully sown on acid soil and are valuable for hay, grain, pasturage or soil improvement. More use should be made of rye or rye and vetch, for green manure and hay. Where possible live stock raising or dairying should be followed and the manure carefully returned to the soil. It will be necessary to supply liberal quantities of phosphoric acid in order to make this soil very productive. Some soluble potash would probably be profitable, but this element is fairly abundant in the soil and should be made available by the action of decaying organic matter.

Plainfield fine sand, rolling phase.—The Plainfield fine sand, rolling phase, consists of a loose, incoherent, light-brown or grayish-brown fine sand, about 8 inches deep, underlain by a light yellowish brown, incoherent fine sand which extends to a great depth. There is little range in the size of the soil particles over 50 per cent consisting of fine sand with practically none of coarser grades than medium sand. The surface may be dark in wooded and grassy areas or light yellow where cultivated

or disturbed by the wind. In places the subsoil is stained with iron to a reddish or bright orange color.

The Plainfield fine sand, rolling phase, occupies the broken ridge which separates the southern, silty half of White County from the northern or sandy half, and occurs throughout the latter region. Some of the largest and most typical areas are encountered in Cass Township.

The soil typically occupies ridges lying from 3 to 40 feet or more above the surrounding land. One side of the ridge always is rather steep and the other side is a more gradual slope. The phase appears to have been formed by wind action from the same material as the typical soil at a time when the land surface was not protected by vegetation. Some of the larger ridges may have been glacial moraines, but such material is now deeply covered with loose fine sand and no rocks or gravel are observed on the surface. Topographically this soil grades into the typical Plainfield fine sand. Some of the broader areas of the rolling phase of the Plainfield fine sand are not distinct ridges but rather a series of choppy or billowy knolls which stand higher above the general water table than the typical Plainfield areas. On account of its porous structure and elevated position, this phase is well to excessively drained.

The droughtiness, roughness, and low fertility of this land make it the least desirable soil in White County. It comprises 11.3 per cent of the total area of the county. About half of it is cultivated and the remainder is in scrubby oak timber and in pasture.

Corn is the principal crop grown on this phase. Rye, wheat, oats, and cowpeas are also grown on the ridges.

It is estimated that corn yields will average 10 to 15 bushels per acre and other crops in proportion. On the flatter areas and in wet years the yields almost equal the normal yields on the Plainfield fine sand.

This land is handled like the typical Plainfield fine sand, though it is not thought worth while to expend much effort on it and fertilizers are supposed to be depleted by leaching. Corn is grown more extensively than other crops because cultivation conserves the moisture very well. Rye is grown to protect the land from blowing and to furnish organic matter.

Farms composed largely of this phase are valued at $20 to $75 an acre.

GENESEE FINE SANDY LOAM.

The Genesee fine sandy loam consists of a brown, mellow fine sandy loam, averaging 10 inches in depth, underlain by a light-brown or grayish-brown fine sandy loam, slightly mottled in the lower part with gray and brown. The substratum consists of alluvium ranging in texture from clay to sand and gravel. Included

with this type along Big and Spring Creeks are a few areas of Fox fine sandy loam which are too small to be shown on the map.

This type occurs as narrow strips along the Tippecanoe River and some of the larger creeks. The topography is generally level, but more or less dissected by old stream channels. Along Big and Spring Creeks the surface of the type is rather uneven. The type is subject to overflows at the time of the spring freshets or after very heavy rains, but at other times the natural drainage is good.

The Genesee fine sandy loam is very inextensive in White County and of little agricultural importance. About 75 per cent of the type is farmed and the remainder supports the original forest growth, consisting mainly of sycamore, willow, water maple, elm, papaw, hackberry, and oak. The principal crops grown are corn and oats. A part of the type is used as pasture land.

The acreage yields of corn and oats range from 20 to 60 bushels and probably average 30 bushels. This type is recognized as a good corn soil and most of it is planted to that crop. Careful cultivation is needed to keep the fields free from weeds, as they are reseeded by the frequent overflows. Fertilizers are rarely used.

The value of this land depends on the character of the adjoining soils and the location with reference to markets. Most of it is probably held at $100 an acre.

The Genesee fine sandy loam is a sweet soil and the better drained areas are well suited to the production of clover. Corn yields can be increased through cultivation and careful seed selection.

FOX FINE SANDY LOAM.

The Fox fine sandy loam consists of a light-brown to brown fine to medium sandy loam, grading at about 10 inches into a light-brown fine sandy loam or loam, which passes into a light grayish brown gravelly loam or earthy gravel. The substratum consists of loose gravel and stones, ranging up to several inches in diameter. A large proportion of the gravel is derived from limestone. The lower subsoil effervesces with acid.

This type occurs in a terrace position along the Tippecanoe River as far north as Wrights Ford and along Moots Creek and in a few small areas along the other large creeks. It lies above flood level, being in places 30 to 40 feet above the streams. The topography is prevailingly flat, but some areas slope decidedly from the uplands to the first bottoms and are of uneven surface due to erosion. The surface drainage is complete and the gravelly substratum makes the soil rather droughty.

This type comprises only 0.5 per cent of the area of White County, but most of it is cultivated. Probably 15 to 25 per cent of it is in

pasture and woodlots. Corn, oats, and wheat are the principal crops grown.

The ordinary yield of corn and oats is 25 to 30 bushels and of wheat about 12 to 15 bushels per acre. In wet seasons much larger yields are sometimes obtained.

The Fox fine sandy loam is handled and fertilized much like the associated Miami soils.

Farm land of this type sells for about $100 to $125 an acre. Some areas have a higher value because of the gravel pits located on them.

This soil would be benefited by more thorough cultivation to conserve moisture and by the growing and plowing under of green manuring crops, particularly the legumes.

MUCK.

Muck consists almost wholly of decayed vegetable matter. It is black in color and from 12 inches to 3 feet in depth. Where the material is deep it is underlain by a brown, fibrous peat or a smooth loam, and where shallow, by deep beds of brownish and grayish fine sand.

Muck occurs in small areas throughout the sandy part of the county. The largest area occurs east of Lee, in Monon Township. It occupies flat depressions.

This material was formed from the decay of the heavy growth of marsh grasses, flags, rushes, and mosses in the old ponds and marshes and was formerly covered with water most of the year. Most of the areas are now ditched and tiled and used for agriculture.

Owing to its small extent, Muck is of little importance in White County. Probably 75 per cent of it is under cultivation, the remainder being used for the production of marsh hay and as pasture land. Corn and oats are the principal crops grown. In one or two instances onions have been grown on this soil with moderate success.

Corn and oats make an average yield of about 35 or 40 bushels per acre with the usual fertilization. The use of fertilizer on corn not only increases the yield, but greatly improves the quality of the grain.

Muck is handled like the other black soils of the county and is often planted to corn for several years in succession. As a rule the soil becomes unproductive after several crops of corn have been grown in succession, and is usually treated with kainit, muriate or sulphate of potash, or a mixture containing potash and phosphoric acid. The fertilizer is applied at the rate of 100 pounds to 200 pounds per acre by means of an attachment on the corn planter.

The price of Muck varies considerably, depending on drainage, distance from towns, and the nature of the soils with which it is associated.

In northern Indiana a number of special crops are successfully grown on land of this kind. It is a fine onion soil and sometimes produces large yields of this crop. There is considerable risk in growing onions, however, owing to the variability of yields and prices, and the great amount of hand labor involved. Mint is another special crop well suited to Muck, but there are no stills for the extraction of the oil in White County. Celery, hemp, sugar beets, and sunflower seed are profitable crops on this class of soil in other localities and might be tried in White County if special knowledge and facilities were provided. Irish potatoes are a more practicable crop for this soil in White County than any of the other crops named. Purdue University recommends an acreage application of 200 pounds each of acid phosphate and sulphate of potash for potatoes on this class of soil. In places the Muck is sweet and requires no lime, while in others it is sour, as shown by the growth of huckleberries, dewberries, and similar plants, as well as by acidity tests. The sour soil requires applications of ground limestone, and usually is more in need of phosphoric acid than of potash.

SUMMARY.

White County is situated in the northwestern part of Indiana. It comprises an area of 507 square miles, or 324,480 acres.

The topography is that of a gently undulating plain lying more than 700 feet above sea level, with the narrow valleys of the Tippecanoe River and larger creeks cut 20 to 120 feet below the general elevation. The northern half of the county is an old lake plain characterized by black, formerly marshy, sandy lands and light sand ridges. The southern half is a glacial plain with low moraines, and includes both timbered and prairie lands. The county is now completely drained by systems of dredged and scraped ditches and by tiles.

The climate of the county is temperate, though great and sudden variations occur. The mean annual temperature is 50.1° F., the absolute maximum temperature recorded being 104° and the absolute minimum −26°. The average annual rainfall amounts to 28 inches and is well distributed throughout the year. There is an average growing season of 150 days.

The population of the county, according to the 1910 census, is 17,602, all of which is classed as rural. Monticello, the county seat and largest town in the county, had a population in 1910 of 2,168. Monon is the next largest town, having a population of 1,184.

The county has good transportation facilities, over 80 per cent of the farms lying within 6 miles of one or more shipping points. There is an almost complete network of good public roads in the county. All parts of the county have rural mail delivery and telephone serv-

ice, and automobiles are in common use. The farm buildings are substantial and commodious.

Farming was begun in White County about 1820. At the present time the predominant type of agriculture is grain farming, in conjunction with the feeding of live stock, corn being the main crop grown. Since 1900 nearly one-third the total area of the county has annually been devoted to the production of corn. Oats, hay, and wheat rank next in importance in the order named. Rye, barley, and buckwheat are grown to a small extent. Enough vegetables are grown for home use, but none for shipment.

Practically all the farmers raise some hogs, and a large number of cattle and sheep are fed in the county each year. Dairying is carried on to some extent.

In 1909 there were 2,091 farms in the county, having an average size of 150.4 acres, and 53.5 per cent of the farms were operated by the owners.

Many farms in the prairie section are valued at more than $200 an acre and those on the light-colored clay lands at $125 to $175 an acre. The average price of land is about $75 an acre.

In all, 8 series of soils, including 16 types, in addition to the miscellaneous type, Muck, were recognized and mapped in the county.

The Miami soils include the light-colored timbered lands of glacial origin, and are used for production of corn, oats, wheat, clover, and the feeding of live stock.

The Bellefontaine series includes the "chocolate-clay lands" and corresponds closely to the Miami soils.

The Carrington series is characterized by dark-brown to black surface soils, with heavier textured, yellowish subsoils. The Carrington silt loam was the first prairie soil to be used for farming in White County.

The Brookston series has dark-brown or dark brownish gray soils and mottled yellow and gray subsoils, the yellow predominating. The natural drainage is poor, but nearly all areas have been artificially drained, and yield well. Only the silt loam type occurs in White County.

The Clyde series includes soils which were originally marshy but are now well drained. The surface soils are black and the subsoils gray or gray mottled with brown. The Clyde fine sandy loam is the most extensive and important type of the lake-plain region of northwestern Indiana.

The Plainfield series includes brownish-gray to brown or yellowish-brown surface soils and yellowish-brown to grayish and brown mottled subsoils of similar to somewhat heavier texture. These soils are naturally well drained. The Plainfield fine sand and its rolling phase are mapped in White County.

The Genesee series includes dark-brown to grayish-brown surface soils, with somewhat lighter brown subsoils. The Genesee fine sandy loam, the only type mapped, is inextensive and unimportant.

The Fox fine sandy loam is a well-drained terrace soil of small extent.

Muck consists almost entirely of decayed vegetable matter. Only a few areas are mapped, but most of these have been artificially drained and are now used for agriculture. This is a good corn soil when fertilized with potash.

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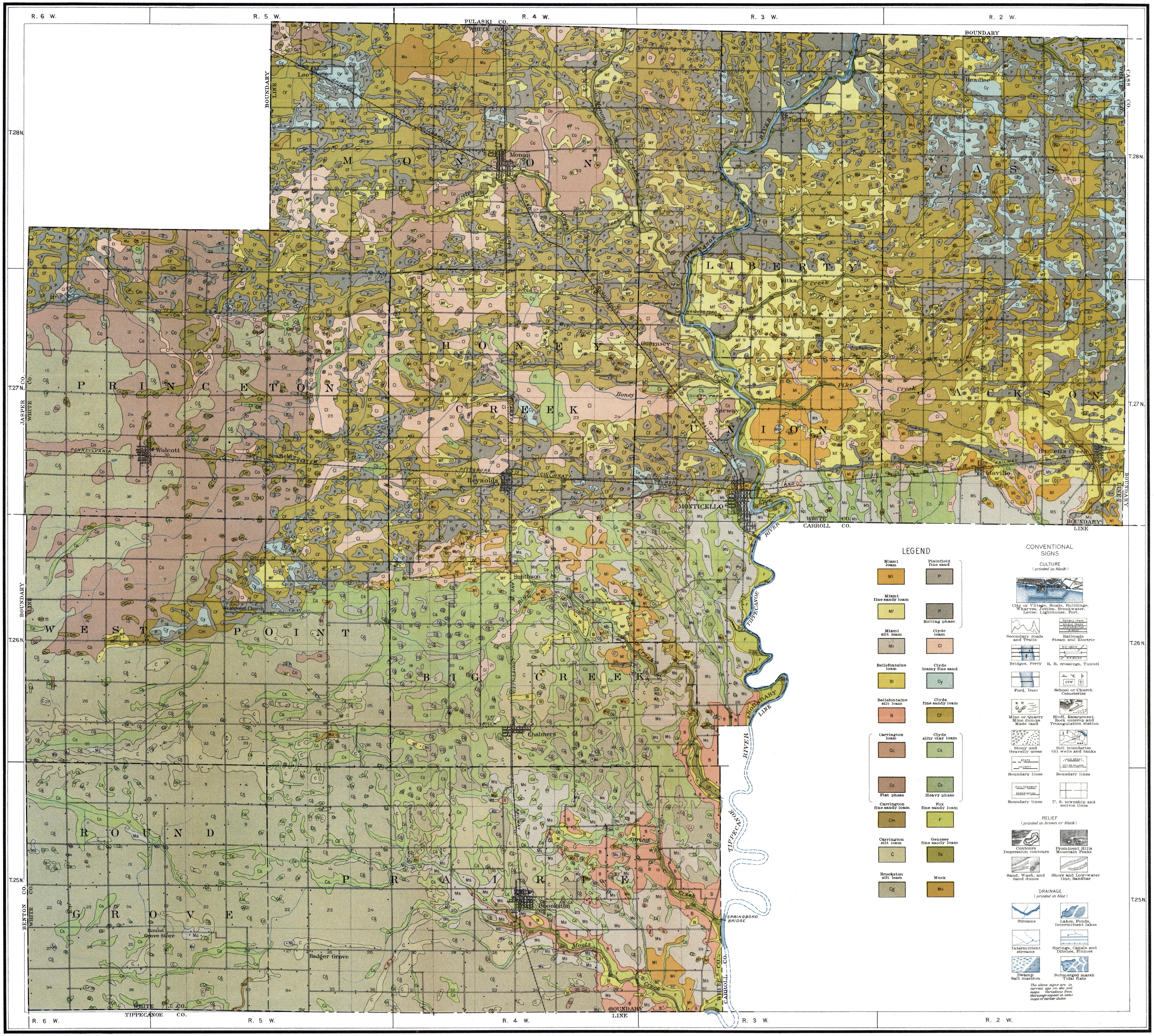
U.S. DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF
CURTIS F. MARBUT, IN CHARGE SOIL SURVEY

SOIL MAP
INDIANA
WHITE COUNTY SHEET

STATE OF INDIANA
DEPARTMENT OF GEOLOGY
EDWARD BARRETT, STATE GEOLOGIST



R. 6 W.
R. 5 W.
R. 4 W.
R. 3 W.
R. 2 W.
T.28N.
T.27N.
T.26N.
T.25N.
PULASKI CO.
WHITE CO.
CASS CO.
CARROLL CO.
TIPPECANOE CO.
JASPER CO.
BENTON CO.
MONON
LIBERTY
CASS
HONEY CREEK
PRINCETON
UNION
JACKSON
WEST POINT
BIG CREEK
ROUND GROVE
PRAIRIE
Monon
Monticello
Wolcott
Reynolds
Brookston
Chalmers
Smithson
Guernsey
Norway
Buffalo
Headlee
Sitka
Idaville
Burnetts Creek
Seafield
Badger Grove
Round Grove Store
Springboro Bridge
TIPPECANOE RIVER
LEGEND
Miami loam Ml
Plainfield fine sand P
Miami fine sandy loam Mf
Rolling phase P
Miami silt loam Ms
Clyde loam Cl
Bellefontaine loam Bl
Clyde loamy fine sand Cy
Bellefontaine silt loam B
Clyde fine sandy loam Cf
Carrington loam Co
Clyde silty clay loam Cs
Flat phase Co
Heavy phase Cs
Carrington fine sandy loam Cm
Fox fine sandy loam F
Carrington silt loam C
Genesee fine sandy loam Gs
Brookston silt loam Cg
Muck Mu
CONVENTIONAL SIGNS
CULTURE (printed in black)
City or Village, Roads, Buildings, Wharves, Jetties, Breakwater, Levee, Lighthouse, Fort.
Secondary roads and Trails
Railroads Steam and Electric
Bridges, Ferry
R. R. crossings, Tunnel
Ford, Dam
School or Church Cemeteries
Mine or Quarry Mine dumps Made land
Bluff, Escarpment, Rock outcrop and Triangulation station
Stony and Gravelly areas
Soil boundaries Oil wells and tanks
Boundary lines
Boundary lines
Boundary lines
U. S. township and section lines
RELIEF (printed in brown or black)
Contours Depression contours
Prominent Hills Mountain Peaks
Sand, Wash, and Sand dunes
Shore and Low-water line, Sandbar
DRAINAGE (printed in blue)
Streams
Lakes, Ponds, Intermittent lakes
Intermittent streams
Springs, Canals and Ditches, Flumes
Swamp Salt marshes
Submerged marsh Tidal flats
The above signs are in current use on the soil maps. Variations from this usage appear in some maps of earlier dates.

W.E.McLandon, Inspector, Northern Division.
Soils surveyed by T.M.Bushnell, of the U.S. Department of Agriculture, in charge, and C.P.Erni, of the Indiana Department of Geology.

Scale 1 inch = 1 mile

SNYDER & BLACK. N.Y.

Field Operations
Bureau of Soils
1915